IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Avinash Jain et al.

Serial No.: 09/877,820

Filed: June 7, 2001

For: METHOD AND APPARATUS FOR CONGESTION CONTROL IN A WIRELESS COMMUNICATION SYSTEM

Examiner: Andrew Chung Cheung Lee

Group Art Unit: 2616

Attorney Docket No.: 010296

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BRIEF ON APPEAL

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Commissioner for Patents
P.O. Box 1450
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Attention: Board of Patent Appeals and Interferences

Sirs:

This brief is submitted pursuant to 37 C.F.R. § 41.37 and in the format required by 37 C.F.R. § 41.37(c) and with the fee required by 37 C.F.R. § 41.20(b)(2).

1) REAL PARTY IN INTEREST

The real party in interest in the present pending appeal is Qualcomm, Inc., the assignee of the pending application as recorded at Reel 011912 Frame 0594 with the United States Patent and Trademark Office (Patent Office).

2) RELATED APPEALS AND INTERFERENCES

Neither Appellant, the Appellant's representative nor the Assignee are aware of any pending appeal or interference which would directly affect, be directly affected by, or have any bearing on the Board's decision in the present pending appeal.

3) STATUS OF THE CLAIMS

No claims were withdrawn.

No claims were canceled.

Claims 1-10 and 13-20 stand rejected.

Claims 11 and 12 were objected to.

No claims were allowed.

The rejection of claims 1-10 and 13-20 is being appealed.

4) STATUS OF AMENDMENTS

No proposed amendments were submitted after the current final rejection.

5) SUMMARY OF THE CLAIMED SUBJECT MATTER

With respect to independent claim 1 and referring to Figs. 1-8, the present invention is directed to a method to determine a next data rate in a mobile station of a wireless system. (Specification, p. 11, line 6-p. 14, line 30 ([1043-1051]); Figs. 5A, 5B, 8). The method includes receiving a congestion indicator from a base station, the congestion indicator includes at least one data bit. (Specification, p. 11, lines 6-30; p. 12, line 26-p. 13, line 18; ([1043], [1046]); Fig. 5A (202), Fig. 5B (302)). The method further includes generating the next data rate in the mobile station as a function of the data rate history and the history of the congestion indicator of the mobile station. (Specification, p. 11, line 6-p. 14, line 30; ([1043-1051]); Fig. 5A (204-220), Fig. 5B (304-320)).

With respect to independent claim 13 and referring to Figs. 1-8, the present invention is directed to a mobile station apparatus. (Specification, p. 16, line 18-p. 17, line 27; p. 11, line 6-p. 14, line 30; ([1055-1059], [1043-1051]); Fig. 8). The apparatus includes a means for receiving a congestion indicator from a base station, the congestion indicator includes at least one data bit. (Specification, p. 16, line 18-p. 16, line 24; p. 11, lines 6-30; p. 12, line 26-p. 13, line 18; ([1055], [1043], [1046]); Fig. 8 (602)). The apparatus further includes a means for generating the next data rate in the mobile station as a function of the data rate history and the history of the congestion indicator of the mobile station. (Specification, p. 16, line 18-p. 17, line 27; p. 11, line 6-p. 14, line 30; ([1055-1059], [1043-1051]); Fig. 8 (604-610), Fig. 5A (204-220), Fig. 5B (304-320)).

With respect to independent claim 17 and referring to Figs. 1-8, the present invention is

directed to an apparatus for determining a next data rate of an access terminal. (Specification, p. 16, line 18-p. 17, line 27; p. 11, line 6-p. 14, line 30; ([1055-1059], [1043-1051]; Fig. 8). The apparatus includes a receive circuit for receiving a congestion indicator having at least one data bit from an access network. (Specification, p. 16, line 18-p. 16, line 24; p. 11, lines 6-30; p. 12, line 26-p. 13, line 18; ([1055], [1043], [1046]); Fig. 8 (602)). The apparatus further includes a data rate adjustment circuit coupled to the receive circuit, the data rate adjustment circuit being configured to generate the next data rate in the access terminal as a function of the data rate history and the history of the congestion indicator of the access terminal. (Specification, p. 16, line 18-p. 17, line 27; p. 11, line 6-p. 14, line 30; ([1055-1059], [1043-1051]); Fig. 8 (604-610), Fig. 5A (204-220), Fig. 5B (304-320)).

6) GROUNDS OF REJECTION TO BE REVIEWED

A. Whether claims 1-3, 8-10, 13-14, 17 and 18 are unpatentable under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,707,862 to Larsson ("Larsson").

B. Whether claims 1-3, 8-10, 13-14, 17 and 18 are obvious under 35 U.S.C. § 103(a) over Larsson in view of U.S. Patent No. 6,097,697 to Yao et al. ("Yao").

C. Whether claims 4-7, 15-16, 19 and 20 are obvious under 35 U.S.C. § 103(a) over Larsson in view of U.S. Patent No. 6,553,235 to Bark et al. ("Bark").

7) ARGUMENT

A. Claims 1-3, 8-10, 13-14, 17 and 18 stand rejected under 35 U.S.C. § 102(e) as being unpatentable over Larsson. Appellant respectfully traverses this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Appellant asserts that Larsson does not and cannot anticipate under 35 U.S.C. § 102 the presently claimed invention of independent claim 1 and claims 2, 3 and 8-10 depending therefrom, independent claim 13 and claim 14 depending therefrom, and independent claim 17 and claim 18 depending therefrom because Larsson does not describe, either expressly or inherently, the identical inventions in as complete detail as are contained in the claims. Specifically, Appellant's independent claims 1, 15 and 17 each recite, in part, "generat[ing]/determining [a] ***next data rate … as a function of …*** [(i)] ***the data rate history***" **and** "[(ii)] ***the history of the congestion indicator***".

The Final Office Action alleges:

> Regarding Claims 1, 13,
> Larsson discloses …receiving a congestion indicator … (… a suitable ***power correction command (interpreted as congestion indicator)*** …; column 2, lines 41-55);
> Larsson discloses ***implicitly generating the next data rate*** in the mobile station ***as a function of data rate history and history of congestion indicator*** …. (Final Office Action, pp. 2-3; emphasis added.)

The Final Office Action then continues with an "implicit" interpretation of the disclosure of Larsson by alleging:

> … ("the data rate to be used in the next frame is chosen by comparing ***the estimated average bit energy Z*** with the set of thresholds, ... selects the data rate to be used by the transmitter from the set r_0, r_1, … r_m, ; … ***estimates the statistical distribution of Z over the last few frames*** based on the current and previous values of Z" ***correlates to generating the next data rate, data rate history and history of congestion indicator***; Fig. 4, column 6, lines 13-55). (Final Office Action, p. 3; emphasis added).

Appellant respectfully disagrees. First, the Final Office Action states that power control (PC) bit received over a forward link ***is the*** "suitable power correction command (interpreted as congestion indicator)". (Final Office Action, pp. 203 citing Larsson, col. 2, lines 41-55). Then the Final Office Action contradictorly states an estimated average bit energy Z "over the last few frames" "***correlates to*** … history of congestion indicator". (Final Office Action, p. 3). Specifically, in one instance the Final Office Action has characterized Appellant's "congestion indicator" as a ***power control (PC) bit calculated by a base station*** and transmitted from the base station to the mobile station. Then, in another contradicting instance in the very same claims, the Final Office Action has ***re-characterized*** Appellant's "congestion indicator" to be ***an estimated bit energy Z calculated at the mobile station.*** Therefore, Appellant respectfully submits that the redefinition of a claim element throughout a claim is improper. Accordingly, Appellant respectfully asserts that the rejection of Appellant's independent claims 1, 13 and 17 is improper and should be withdrawn.

Furthermore, the Final Office Action attempts to establish an anticipation rejection of Appellant's claimed invention through alleged *inherent* disclosure. Appellant respectfully

reiterates that "A claim is anticipated only if ***each and every element*** as set forth in the claim ***is found***, either expressly or inherently described, in a single prior art reference." *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Appellant respectfully asserts that Appellant's claim element, among other things, of "generat[ing]/determining [a] ***next data rate … as a function of …*** [(i)] ***the data rate history***" **and** "[(ii)] ***the history of the congestion indicator***" is **not** disclosed in Larsson either expressly or inherently. The Final Office Action, in an attempt to support an inherent disclosure of Appellant's claim element of "generat[ing]/determining [a] ***next data rate***", cites to an *express* disclosure in Larsson of ***"energy-based"*** measurements and calculations and does not imply or otherwise provide for an interpretation of ***a history of the data rate***. In fact according to the *express* disclosure of Larsson, the only "historical" information *expressly* disclosed is "Z [the estimate of the average bit energy] over the last few frames". (Larsson, col. 6, lines 39-41).

Additionally, Larsson is unequivocal regarding how the next data rate is determined or generated. Specifically, Larsson discloses, "***the data rate to be used in the next frame is chosen by comparing*** the estimated average ***bit energy Z*** with the set of thresholds". (Larsson, col. 6, lines 49-51; emphasis added). Accordingly, Larsson's mere disclosure of the average bit energy "over the last few frames" **cannot** support a finding of an *inherent* anticipatory disclosure under 35 U.S.C. §102 of Appellant's claim including "generat[ing]/determining [a] ***next data rate … as a function of … [(i)] the data rate history***" **and** "[(ii)] ***the history of the congestion indicator***".

Therefore, Appellant's independent claim 1 and claims 2, 3 and 8-10 depending therefrom, independent claim 13 and claim 14 depending therefrom, and independent claim 17 and claim 18, cannot be anticipated under 35 U.S.C. § 102 by Larsson. Accordingly, such claims are allowable over the cited prior art and Appellant respectfully requests the Board reverse the rejections of independent claim 1 and claims 2, 3 and 8-10 depending therefrom, independent claim 13 and claim 14 depending therefrom, and independent claim 17 and claim 18.

B. Claims 1-3, 8-10, 13-14, 17 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larsson in view of U.S. Patent No. 6,097,697 to Yao et al. ("Yao"). Appellant respectfully traverses this rejection, as hereinafter set forth.

To establish a *prima facie* case of obviousness the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981, 985 (CCPA 1974); *see also* MPEP § 2143.03. Additionally, there must be "a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742, 167 L.Ed.2d 705, 75 USLW 4289, 82 U.S.P.Q.2d 1385 (2007). Finally, to establish a *prima facie* case of obviousness there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Furthermore, the reason that would have prompted the combination and the reasonable expectation of success must be found in the prior art, common knowledge, or the nature of the problem itself, and not based on the Applicant's disclosure. *DyStar Textilfarben*

GmbH & Co. Deutschland KG v. C. H. Patrick Co., 464 F.3d 1356, 1367 (Fed. Cir. 2006); MPEP § 2144. Underlying the obvious determination is the fact that statutorily prohibited hindsight cannot be used. *KSR*, 127 S.Ct. at 1742; *DyStar*, 464 F.3d at 1367. Furthermore, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re* Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

The 35 U.S.C. § 103(a) obviousness rejections of claims 1-3, 8-10, 13-14, 17, 18 are improper because the elements for a *prima facie* case of obviousness are not met. Specifically, the rejection fails to meet the criterion that the prior art references must teach or suggest all the claims limitations of independent claim 1 and claims 2, 3 and 8-10 depending therefrom, independent claim 13 and claim 14 depending therefrom, and independent claim 17 and claim 18 depending therefrom. Specifically, Appellant's independent claims 1, 15 and 17 each recite, in part, "generat[ing]/determining [a] ***next data rate … as a function of …*** [(i)] ***the data rate history***" **and** "[(ii)] ***the history of the congestion indicator***".

Appellant respectfully asserts that neither Larsson nor Yao, either individually or in any proper combination, teach or suggest Appellant's invention as presently claimed in independent claim 1 and claims 2, 3 and 8-10 depending therefrom, independent claim 13 and claim 14 depending therefrom, and independent claim 17 and claim 18 depending therefrom.

The Final Office Action concedes:

> Regarding Claims 1, 13, … ***Larsson does not disclose*** explicitly ***generating the next data rate*** in the mobile station ***as a function of data rate history and history of congestion indicator*** of the mobile station. (Final Office Action, pp. 6-7; emphasis added.)

The Final Office Action then alleges:

> Yao et al. teach explicitly generating the next data rate in the mobile station as a function of data rate history and history of congestion indicator of the mobile station ("***the statistics provide indications of congestion*** of the data network. The functions also feature adjusting a transmission rate from the source to destination in response to a combination of the derived statistics" correlates to generating the next data rate in the mobile station as a function of data rate history and history of congestion indicator o the mobile station: column 2, lines 22-29, 42-45, 56-60; column 4, lines 54-58; column 8, lines 28-41). (Final Office Action, p. 7; emphasis added.)

Appellant respectfully asserts that while the Final Office Action states a single entity wherein "the statistics [of Yao] provide *indications of congestion*", Appellant's invention as claimed recites, in part, "in a mobile station … ***receiving*** *a congestion indicator* ***from*** a base station" and "***generat[ing]/determining*** [a] ***next data rate … as a function of …*** [(i)] ***the data rate history***" **and** "[(ii)] ***the history of the congestion indicator***". Appellant respectfully asserts that the Final Office Action's allegation that a single entity generates "the statistics [of Yao]", namely the "***indications of congestion***", as some how teaching or suggesting a "congestion indicator" that is generated by one entity (e.g., base station) and then received by a second entity (e.g., mobile station) is improper.

Therefore, since the Final Office Action concedes that Larsson does not teach or suggest "generating the next data rate in the mobile station as a function of … [the] history of congestion indicators" and since Yao does not teach or suggest "generat[ing]/determining [a] ***next data rate … as a function of … the history of the [received] congestion indicator***", these references, either individually or in any proper combination, **cannot** render obvious, under 35 U.S.C. §103,

Appellant's invention as claimed in Appellant's independent claim 1 and claims 2, 3 and 8-10 depending therefrom, independent claim 13 and claim 14 depending therefrom, and independent claim 17 and claim 18 depending therefrom. Accordingly, Appellant respectfully requests the Board reverse the rejections of claims 1-3, 8-10, 13-14, 17 and 18.

Notwithstanding the overwhelming reasons in support of patentability as set forth above, Appellant further finds the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, and therefore lacking motivation to combine. *In re* Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Specifically, the purpose of Larsson relates to controlling the data rate by "reducing the amount of information, e.g. the number of bits transmitted, in those frames where the bit energy requirement is high [and] [c]onversely, the control increases the number of bits in those frames where the bit energy requirement is low." (Larsson, col. 3, lines 66-col. 4, line 3). Yao teaches "adjusting the transmission rate to the destination in response to a combination of the derived statistics" based on "packet loss". (Yao, col. 2, lines 27-29; col. 8, lines 40-41). Therefore, if Yao's packet-loss data rate adjustment teaching is substituted for Larsson's intra-frame bit energy redistribution data rate adjustment teaching, the intra-frame energy redistribution of Larsson is destroyed since Yao's data rate adjustments occur in response lost packets rather than an analysis of prospective frames to be transmitted.

Furthermore, Appellant further finds no "reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742, 167 L.Ed.2d 705, 75 USLW 4289, 82

U.S.P.Q.2d 1385 (2007). Generally, the references appear uncombinable. Specifically, Larsson, as stated above, teaches of data rate adjustment by redistributing higher energy bits to frames with lower energy. Such a distribution relies upon an analysis of the frame data prior to transmission. In contrast, Yao teaches of data rate adjustment based upon feedback that reveals data packet loss of previously transmitted data. Accordingly, such a combination or modification of the references appears unworkable.

For the foregoing reasons, Appellant respectfully submits that the Final Office Action's rejections of claims 1-3, 8-10, 13-14, 17, 18 are improper and Appellant respectfully requests the Board reverse the rejections.

C. Claims 4-7, 15, 16, 19 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Larsson in view of U.S. Patent No. 6,553,235 to Bark et al. ("Bark"). Appellant respectfully traverses this rejection, as hereinafter set forth.

The nonobviousness of independent claim 1 precludes a rejection of claims 4-7 which depend therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* MPEP § 2143.03. Therefore, the Appellant requests that the Examiner withdraw the 35 U.S.C. § 103(a) obviousness rejection to claims 4-7 which depend from independent claim 1.

The nonobviousness of independent claim 13 precludes a rejection of claims 15 and 16 which depend therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see*

also MPEP § 2143.03. Therefore, the Appellant requests that the Examiner withdraw the 35 U.S.C. § 103(a) obviousness rejection to claims 15 and 16 which depend from independent claim 13.

The nonobviousness of independent claim 17 precludes a rejection of claims 19 and 20 which depend therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See* In re Fine, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* MPEP § 2143.03. Therefore, the Appellant requests that the Examiner withdraw the 35 U.S.C. § 103(a) obviousness rejection to claims 19 and 20 which depend from independent claim 17.

8) CLAIMS APPENDIX

A copy of claims 1-10 and 13-20 is appended hereto as Appendix A. Claims 1-10 and 13-20 are involved in the Appeal. Claims 12 and 13 were objected to and therefore do not appear in Appendix A.

9) EVIDENCE APPENDIX

There is no evidence appendix.

10) RELATED APPEALS APPENDIX

There is no related appeals appendix.

CONCLUSION

Appellant respectfully submits that claims 1-10 and 13-20 are allowable. Appellant respectfully requests the reversal of the rejections of currently pending claims 1-10 and 13-20 for the reasons set forth above.

Respectfully submitted,

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APPENDIX A

Claims Appendix

Claims 1-10 and 13-20

U.S. Patent Application No. 09/877,820

Filed June 7, 2001

1. A method to determine a next data rate in a mobile station of a wireless system, comprising:

receiving a congestion indicator from a base station, the congestion indicator includes at least one data bit; and

generating the next data rate in the mobile station as a function of the data rate history and the history of the congestion indicator of the mobile station.

2. The method as in claim 1, wherein generating the next data rate further comprises:

comparing at least one previous data rate to a target data rate for the mobile station; and

in response to a first result of comparing determining the next data rate by adjusting at least one data rate.

3. The method of claim 1, wherein adjusting the at least one previous data rate performs a statistical analysis.

4. The method of claim 1, wherein generating the next data rate further comprises:

counting a number of consecutive same value congestion indicators; and

if the number of consecutive same value congestion indicators is less than a predetermined maximum number, determining the next data rate by maintaining the at least one previous data rate.

5. The method as in claim 4, wherein generating the next data rate further comprises:

if the number of consecutive same value congestion indicators is equal to or greater than the maximum number, determining the next data rate by adjusting the at least one previous data rate.

6. The method as in claim 5, wherein for a first congestion condition if the previous data rate is greater than the target data rate, adjusting comprises decreasing.

7. The method as in claim 6, wherein for a second congestion condition if the previous data rate is less than the target data rate, adjusting comprises increasing.

8. The method as in claim 1, wherein the next data rate is generated at the mobile station and is independent of other mobile stations.

9. The method as in claim 1, wherein the maximum number is predetermined.

10. The method as in claim 1, wherein the congestion indicator comprises multiple bits.

13. A mobile station apparatus, comprising;

means for receiving a congestion indicator and determining a congestion condition therefrom, the congestion indicator being received from a base station and includes at least one data bit; and

data rate control means for determining a next data rate for the mobile station as a function of the history of the congestion indicator and the data rate history of the mobile station.

14. The apparatus as in claim 13, further comprising:

comparison means for comparing a previous data rate to a target rate for the mobile station,

wherein the data rate control means generates a next data rate by adjusting the previous data rate in response to a first result of comparing the previous data rate to the target data rate.

15. The apparatus as in claim 13, further comprising:

counting means for counting a number of consecutive same value congestion indicators,

wherein the data rate control means generates the next data rate by maintaining the previous data rate in response to a second result of comparing the previous data rate to the target data rate when the number of consecutive same value control indicators is less than a maximum number.

16. The apparatus as in claim 15, wherein the data rate control means generates the next data rate by adjusting the previous data rate when the number of consecutive same value control indicators is equal to or greater than the maximum number.

17. An apparatus for determining a next data rate of an access terminal, comprising:

a receive circuit for receiving a congestion indicator having at least one data bit from an access network; and

a data rate adjustment circuit coupled to the receive circuit, the data rate adjustment circuit being configured to generate the next data rate in the access terminal as a function of the data rate history and the history of the congestion indicator of the access terminal.

18. The apparatus as in claim 17 further comprising a comparator configured to compare a previous data rate to a target data rate for the access terminal, the comparator being coupled to the data rate adjustment circuit, wherein the data rate adjustment circuit being configured to generate the next data rate by adjusting the previous data rate in response to a result of comparing the previous data rate to the target rate.

19. The apparatus as in claim 18 further comprising a counter configured to count the number of consecutive same value congestion indicators, wherein the data rate adjustment circuit being configured to generate the next data rate by maintaining the previous data rate in response to the result of comparing the previous data rate to the target rate when the number of consecutive same value congestion indicators is less than a predetermined number.

20. The apparatus as in claim 19 wherein the data rate adjustment circuit being configured to generate the next data rate by adjusting the previous data rate when the number of

consecutive same value congestion indicators is equal to or greater than the predetermined number.